

REMARKS

Applicants' attorney would like to thank the Examiner for her careful consideration in this application and the courteous telephonic interview extended to the undersigned on June 15, 2006. During the interview Applicants' attorney and the Examiner discussed the merits of each of the cited references in the context of the rejections set forth in the office action dated April 21, 2006. The Examiner suggested that the Applicants submit arguments in writing and that the Examiner would respond to each argument in the Examiner's Answer.

Claims 1-16 are pending in the present application. Claims 1, 3, 6-9, 12 and 13 have been amended. Support for all amendments can be found in the specification as originally filed. No new matter has been added.

Objections to Claims

Claims 12 and 13 stand objected to because the Examiner feels the use of "poly(acrylic acid-co-octylacrylamide)" seems incorrect. Applicants have amended claims 12 and 13 in keeping with the Examiners suggestion. Reconsideration and withdrawal of the Examiners objections to claims 12 and 13 are respectfully requested.

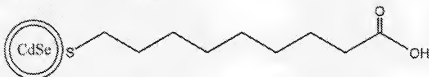
Rejections under 35 USC 103

Claims 1-16 stand rejected under 35 USC 103(a) as being unpatentable over U.S. Patent No. 6,319,426 to Bawendi et al. (hereinafter "Bawendi") in view of U.S. Patent No. 5,221,334 to Ma et al. (hereinafter "Ma") and also Ma in view of Bawendi.

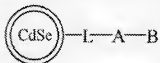
With respect to Bawendi and Ma (and any combination thereof), a couple of basic points are discussed below for clarification purposes. As discussed in the interview, quantum dots themselves are composed of metal salts, and if exposed to aqueous solvent (without modification) they would rapidly dissolve in the solvent (in the process losing their functionality as a quantum dot). The quantum dots of Bawendi are rendered water dispersible because the metal ion of the quantum dot interacts with a polar linking group. The quantum dot is further passivated by a protecting layer (in the case of Bawendi a hydrophobic layer) which stabilizes the quantum dot by shielding it from the aqueous environment. The hydrophobic coating of Bawendi includes a pendant hydrophilic group which allows the quantum dot to be

water soluble while maintaining its function of fluorescing. Without the pendent hydrophilic portion, the passivated quantum dots would not be water soluble.

Classically, Bawendi utilizes uses a thio acetic acid to disburse nanocrystals in the aqueous solvent. The sulfur of the thio acetic acid acts as the linking moiety; the alkyl chain acts as the passivation layer; and the pendant carboxyl group allows sufficient interaction and water solubility of the quantum dot. This is schematically illustrated in Fig. 6 of Bawendi (produced below for the Examiner's convenience).



This figure is reproduced because this important contribution to the art by Bawendi is exactly what he describes in the context of an AB copolymer. Indeed, Bawendi requires the AB copolymer be linked to the quantum dot, stating clearly that an AB copolymer may be used as long as it has the requisite linking group (see column 13 lines 5 through 28) and pendant hydrophilic portion. Schematically, this would be shown as:



To suggest that Bawendi contemplates an AB copolymer without linking it to the quantum dot, would likely destroy the intended purpose of Bawendi. The quantum dot alone (and for that matter the functionalized quantum dot) is hydrophilic and if admixed with an AB copolymer, the hydrophilic regions would be expected to interact with the hydrophilic portion of the AB copolymer thereby exposing the hydrophobic regions of the AB block copolymer to the solution, making the surface modified quantum dot more water insoluble.

Ma does nothing to rectify this situation. Ma simply provides an AB block copolymer whose hydrophobic portion interacts with a hydrophobic particle to render the hydrophobic particle water soluble by exposing the hydrophilic portion of the block copolymer to the solution. However, Bawendi never starts with a hydrophobic particle. The quantum dot of Bawendi alone is hydrophilic and the functionalized quantum dot of Bawendi is water soluble (that, in fact is the point of Bawendi). One skilled in the art would not turn to Ma with a reasonable expectation of success unless they modify the AB copolymer to have two pendant hydrophilic regions (i.e. the linking group and the "B" portion). Applicant does not do this.

Instead, Applicant recognized that passivating the quantum dot with a relatively hydrophobic agent and then exposing the relatively hydrophobic quantum dot to an AB copolymer would allow water dispersibility of a quantum dot. This step of forming a hydrophobic passivating layer is now expressly recited in the claims, and is neither anticipated nor suggested by Bawendi, Ma or any other reference of which Applicant is aware. Without wishing to be bound by theory, it appears the hydrophobic passivating layer interacts with the "A" portion of the AB copolymer, exposing the "B" portion of the AB copolymer to a hydrophilic solvent.

While Applicant's attorney strongly believes that the Ma reference is rendered remote in applicability by the express recitation of this step (there is no need for or contemplation of "passivating" in Ma), due to the relatively late stage of prosecution, Applicant has also amended the claims to recite "quantum dot nanoparticles". Quantum dot nanoparticles are particles with specific size dependent optical and electronic properties. This removes any tangential relationship that Ma may have had to the present invention.

The Examiner is respectfully reminded that there must be a motivation or suggestion in the art to modify the references as suggested by the Examiner and a reasonable expectation of success is required. The teachings or suggestions to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicants' disclosure." See MPEP § 2142, citing *In re Vaeck*, 20 USPQ 2d. 1438 (Fed. Cir. 1991).

The claim amendments made in this response are made solely to facilitate immediate allowance of this case and/or to place the claims in better condition for appeal. Applicant expressly reserves the right to pursue claims of different or greater scope in this or a later filed application.

CONCLUSION

In view of the above amendments and remarks, it is believed that pending claims 1-16 are in condition for allowance and notice to such effect is respectfully requested. Although Applicants believe no fees are due, the Commissioner is hereby authorized to charge Deposit Account No. 50-0436 for any fees that may be due in connection with this response. Should the Examiner have any questions regarding this application, the Examiner is invited to initiate a telephone conference with the undersigned.

Respectfully Submitted,



Raymond A. Miller
Registration No. 42,891

Dated: June 21, 2006
Pepper Hamilton LLP
One Mellon Center
50th Floor
500 Grant Street
Pittsburgh, PA 15219
412.454.5000
412.281.0717 - facsimile